IMO

INSTRUCTION MANUAL

# HD2

## PROFIBUS Communication Card

# 1. PROFIBUS communication card

## 1.1 Overview

PROFIBUS communication cards are optional accessories for inverters. They can be used to connect inverters to PROFIBUS networks. On a PROFIBUS network, inverters are slave devices. The following functions can be performed by using a PROFIBUS communication card:

- Transmit control commands (such as start, stop, and fault reset) to an inverter.
- Transmit speed or torque reference signals to an inverter.
- Obtain state values and actual values from an inverter.
- Modify parameter values of an inverter.

## 1.2 Features

1. PROFIBUS is an international open fieldbus standard that can implement data exchange between various automation components. It is widely applicable to automation in various industries, such as the manufacturing, process, building, transportation, and power industries. It provides effective solutions for implementing integrated automation of field devices.

2. PROFIBUS consists of three mutually compatible components, namely PROFIBUS-Decentralised Peripherals (DP), PROFIBUS-Process Automation (PA), and PROFIBUS-Fieldbus Message Specification (FMS). It adopts the master-slave mode and is generally used for periodic data exchange between inverter devices. PRNV PROFIBUS-DP adapter modules support only the PROFIBUS-DP protocol.

3. The transmission media of a PROFIBUS field bus are twisted pairs (complying with the RS-485 standard), paired cables, or optical cables. The baud rate ranges from 9.6 kbit/s to 12 Mbit/s. The maximum length of a fieldbus cable must be within the range of 100 m to 1200 m, and the specific length depends on the selected transmission rate (see the chapter of "Technical Data" in the inverter manual). A maximum of 31 nodes can be connected to one PROFIBUS network segment when no repeater is used. If repeaters are used, a maximum of 127 nodes (including the repeaters and master stations) can be connected.

4. In PROFIBUS communication, tokens are transmitted between master stations or by master stations to slave stations. Single-master or multi-master systems are supported. The node to respond to the command of a master is selected by the master station, generally a programmable logic controller (PLC). For cyclic master-slave user data transmission and non-cyclic master-master data transmission, a master can also transmit commands to multiple nodes in broadcast mode. When the broadcast mode is adopted, the nodes do not need to transmit feedback signals to the master. On PROFIBUS networks, nodes cannot communicate with each other.

5. The PROFIBUS protocol is described in detail in the EN50170 standard. For more information about PROFIBUS, refer to the EN50170 standard.

## 2.3 Electrical connection

1. Node selection

   The node address of a device is unique on a PROFIBUS bus. The node address is set through the function parameter P15.01, and the value ranges from 0 to 127.

2. Fieldbus terminator

   Each fieldbus segment is configured with two bus terminators, one on each end, to prevent operation errors. Bus terminators can protect the fieldbus signal against electrical reflections. The dual in-line package (DIP) switch on the printed circuit board (PCB) of a communication card is used to connect to the fieldbus terminator. If the communication card is the last or first module on the network, the bus terminator must be set to ON. When a PROFIBUS D-sub connector with a built-in terminator is used, you must disconnect the communication card from the terminator.

## 2.4 Bus network connection

1. Bus communication interfaces
   The most common PROFIBUS transmission mode is the shielded twisted-pair copper cable transmission, in which shielded twisted-pair copper cables (complying with the RS-485 standard) are used.

   The basic characteristics of this transmission technology are described as follows:

   - Network topology: Linear bus with one active fieldbus terminal resistor on each end
   - Transmission rate: 9.6 kbit/s–12 Mbit/s
   - Media: Shielded or unshielded twisted-pair cables, depending on the EMC environmental conditions
   - Number of stations: 32 on each network segment (without repeater); a maximum of 127 (with repeaters)
   - Plug connection: 9-pin D-type plug. The following figure shows the pins of the connector.

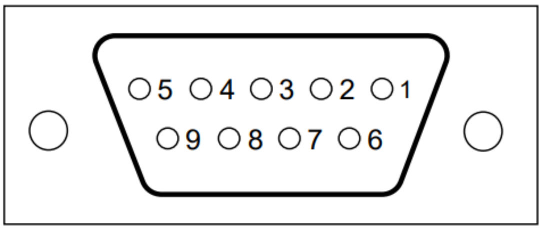



Figure 2-1 Plug of the connector

Table 2-1 Description of the connector pins

| Connector pin | | Description |
|---|---|---|
| 1 | - | Unused |
| 2 | - | Unused |
| 3 | B-Line | Data+ (twisted-pair wire 1) |
| 4 | RTS | Transmitting requests |
| 5 | GND_BUS | Isolation ground |
| 6 | +5V BUS | Isolated 5 V DC power supply |
| 7 | - | Unused |
| 8 | A-Line | Data- (twisted-pair wire 2) |
| 9 | - | Unused |
| Housing | SHLD | PROFIBUS cable shielding wire |

The +5V and GND_BUS pins are used for bus terminators. Optical transceivers (RS-485) and some other devices may need to obtain external power supplies through these pins.

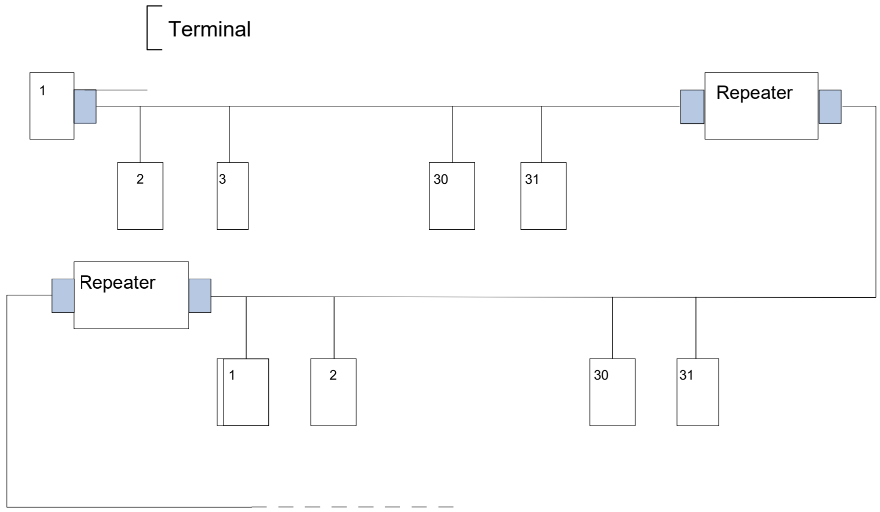
For some devices, the transmission direction is determined by using the RTS pin. In regular application, only the A-Line, B-Line, and SHLD pins are used.

It is recommended that you use the standard DB9 connectors manufactured by Siemens. If the communication baud rate is required to be higher than 187.5 kbps, strictly follow the wiring standards stipulated by Siemens.

2. Repeaters

A maximum of 32 stations (including the master station) can be connected to each fieldbus segment. If the number of stations to be connected to a fieldbus segment exceeds 32, you need to use repeaters to connect the fieldbus segments. Generally, the number of repeaters connected in series cannot exceed 3.

**Note:** No station address is provided for repeaters, but they are calculated as stations.




3. Transmission rates and maximum transmission distances

The maximum length of a cable depends on the transmission rate.

Table 2-2 Transmission rates and corresponding transmission distances

| Transmission rate (kbps) | A-type wire (m) | B-type wire (m) |
|---|---|---|
| 9.6 | 1200 | 1200 |
| 19.2 | 1200 | 1200 |
| 93.75 | 1200 | 1200 |
| 187.5 | 1000 | 600 |
| 500 | 400 | 200 |
| 1500 | 200 | ----- |
| 12000 | 100 | ----- |

Table 2-3 Transmission wire parameters

| Parameter | A-type wire | B-type wire |
|---|---|---|
| Impedance (Ω) | 135–165 | 100–130 |
| Capacitance of a unit length (pF/m) | < 30 | < 60 |
| Circuit resistance (Ω/km) | 110 | -------- |

| | | |
|---|---|---|
| Wire core diameter (mm) | 0.64 | > 0.53 |
| Sectional area of wire core ($mm^2$) | > 0.34 | > 0.22 |

Besides the shielded twisted-pair copper cables, you can also use optical fibers for transmission in a PROFIBUS system. When a PROFIBUS system is applied in an environment with strong electromagnetic interference, you can use optical fiber conductors to increase the high-speed transmission distance. Two types of optical fiber conductors can be

4. PROFIBUS bus connection diagram

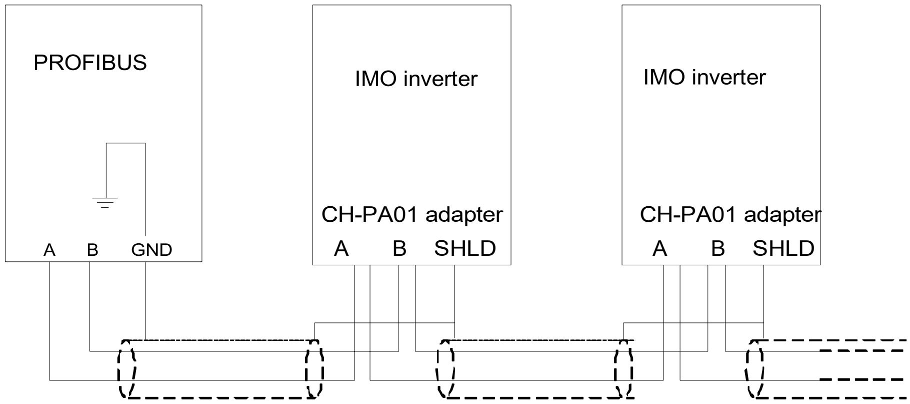



Figure 2-3 PROFIBUS bus connection

Figure 2-3 shows the terminal wiring. The cables are standard PROFIBUS cables, each consisting of a twisted pair and shielding layer. The shielding layers of PROFIBUS cables are directly grounded on all nodes. You can select a proper grounding mode based on the actual situation on site.

**Note:**

- When connecting the stations, ensure that the data cables are not twisted together. For systems to be used in environments with strong electromagnetic radiation, you need to use cables with shielding layers. The shielding layers can improve electromagnetic compatibility (EMC).
- If shielding braid or shielding foil is used, connect the two ends of it to the protective ground and cover an area as large as possible to ensure high conductivity. In addition, data cables need to be separated from high-voltage cables.
- When the data transmission rate is higher than 500 kbit/s, do not use short stub. Use the plugs available in the market. Data input and output cables can be directly connected to those plugs, and the plug of the communication card can be connected or disconnected at any time without interrupting data communication of other stations.

## 2.5 System configuration

1. System configuration

After the communication card is properly installed, you need to configure the master station and inverter to enable the communication between the master station and communication card.
One device description file named GSD file is required for each PROFIBUS slave station on the PROFIBUS bus. The GSD file is used to describe the characteristics of the PROFIBUS-DP device. The software we provide for users includes information about the GSD file of the inverter. You can obtain the type definition files (GSD files) of various masters from IMO.

Table 2-4 Communication card configuration parameters

| Parameter No. | Parameter name | Setting options | | Default setting |
|---|---|---|---|---|
| 0 | Module type | Read-only | | PROFIBUS-DP |
| 1 | Node address | 0–99 | | 2 |
| 2 | Baud rate setting | kbit/s | 0: 9.6 | 6 |
| | | | 1: 19.2 | |
| | | | 2: 45.45 | |
| | | | 3: 93.75 | |
| | | | 4: 187.5 | |
| | | | 5: 500 | |
| | | Mbit/s | 6: 1.5 | |
| | | | 7: 3 | |
| | | | 8: 6 | |
| | | | 9: 9 | |
| | | | 10: 12 | |
| 3 | PZD3 | 0–65535 | | 0 |
| 4 | PZD4 | 0–65535 | | 0 |
| ... | ... | 0–65535 | | 0 |
| 10 | PZD12 | 0–65535 | | 0 |

2. Module type

This parameter displays the model of the communication card detected by the inverter. You cannot modify the value of this parameter. If the parameter is not defined, communication between the communication card and inverter cannot be established.

3. Node address

On the PROFIBUS network, each device corresponds to one unique node address. The node address is set through P15.01.

4. GSD file

One device description file named GSD file is required for each PROFIBUS slave station on the PROFIBUS bus. The GSD file is used to describe the characteristics of the PROFIBUS-DP device. The GSD file includes all parameters defined for the device, including the supported bard rate, supported information length, input/output data amount, and definitions of diagnosis data.
You can obtain the type definition files (GSD files) of various masters from IMO's official website and copy the GSD files to the corresponding subdirectories on the configuration tool software. For details about the operation and how to configure the PROFIBUS system, see the instructions for the related system configuration software.

## 2.6 PROFIBUS-DP communication

1. PROFIBUS-DP

PROFIBUS-DP is a distributed input/output (I/O) system. It enables a master to use a large number of peripheral modules and on-site devices. Data transmission is periodic: The master reads information input by a slave and transmits a feedback signal to the slave.

2. SAP

The PROFIBUS-DP system uses the services at the data link layer (Layer 2) through service access points (SAPs). Functions of each SAP are clearly defined. For more information about SAPs, see the related PROFIBUS master user manuals, that is, PROFIdrive—PROFIBUS models or EN50170 standards (PROFIBUS protocol) for variable-speed drives.

3. PROFIBUS-DP information frame data structure

The PROFIBUS-DP system allows fast data exchange between the master and inverter devices. For inverter devices, data is always read and written in the master/slave mode. Inverters always function as slave stations, and one address is clearly defined for each slave station. PROFIBUS transmits 16-bit packets periodically. Figure 2-4 shows the structure of the packet.

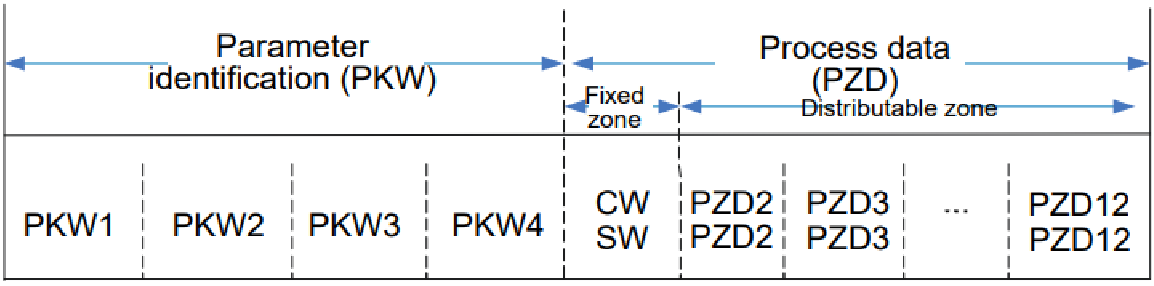



Figure 2-4 PROFIBUS-DP information frame data structure

Parameter zone:

PKW1—Parameter identification

PKW2—Array index number PKW3—Parameter value 1

PKW4—Parameter value 2

Process data:

CW—Control word (transmitted from the master to a slave. For description, see Table 2-5) SW—State word (transmitted from a slave to the master. For description, see Table 2-7.) PZD—Process data (defined by users)

(When the process data is output by the master to a slave, it is a reference value; and when the process data is input by a slave to the master, it is an actual value.)

PZD zone (process data zone): The PZD zone in a communication packet is designed for controlling and monitoring an inverter. The master and slave stations always process the received PZD with the highest priority. The processing of PZD takes priority over that of PKW, and the master and slave stations always transmit the latest valid data on the interfaces.

CWs and SWs

Using CWs is the basic method of the fieldbus system to control inverters. A CW is transmitted by the fieldbus master station to an inverter device. In this case, the HD2-E-PDP communication card functions as a gateway. The inverter device responds to the bit code information of the CW and feeds state information back to the master through an SW.

Reference value: An inverter device may receive control information in multiple channels, including analog and digital input terminals, inverter control panel, and communication modules (such as RS485 and HD2-E-PDP communication cards). To enable the control over inverter devices through PROFIBUS, you need to set the communication module as the controller of the inverter device.

Actual value: An actual value is a 16-bit word that includes information about inverter device operation. The monitoring function is defined through inverter parameters. The conversion scale of an integer transmitted as an actual value from the inverter device to the master depends on the set function. For more description, see the related inverter operation manual.

Note: An inverter device always checks the bytes of a CW and reference value. Task packet (master station -> inverter)

CW: The first word in a PZD task packet is an inverter CW. The definitions of CWs on the PWM rectifier feedback side are different from those on the inverter side. Table 2-5 and Table 2-6 describe the definitions of CWs on the two sides.

Table 2-5 HD2 series CWs

| Bit | Name | Value | State to be entered/description |
|---|---|---|---|
| 0–7 | Communication-based control command | 1 | Forward running |
| | | 2 | Reverse running |
| | | 3 | Forward inching |
| | | 4 | Reverse inching |
| | | 5 | Decelerating to stop |
| | | 6 | Coasting to stop (emergency stop) |
| | | 7 | Fault reset |
| | | 8 | Inching stopped |
| | | 9 | Pre-excitation |
| 8 | Enable writing | 1 | Enabling writing (mainly through PKW1 to PKW4) |
| 9–10 | Motor group setting | 00 | Motor 1 |
| | | 01 | Motor 2 |
| 11 | Control mode switching | 1 | Enabling the switching between torque control and speed control |
| | | 0 | No switching |
| 12 | Reset power consumption to zero | 1 | Enabling the function for resetting power consumption to zero |
| | | 0 | Disabling the function for resetting power consumption to zero |
| 13 | Pre-excitation | 1 | Enabling pre-excitation |
| | | 0 | Disabling pre-excitation |
| 14 | DC braking | 1 | Enabling DC braking |

| | | | |
|---|---|---|---|
| | | 0 | Disabling DC braking |
| 15 | Heartbeat reference | 1 | Enabling heartbeat |
| | | 0 | Disabling heartbeat |

Reference value (REF): The second to twelfth words in a PZD task packet are the main settings. The main frequency settings are provided by the main setting signal source. There is not main frequency setting on the PWM rectifier feedback side, and therefore the corresponding settings are reserved. Table 2-6 describes the settings on the HD2 series inverter side.

Table 2-6 Settings on the HD2 series inverter side

<table>
<tr><th>Function code</th><th>Word</th><th>Value range</th><th>Default value</th></tr>
<tr><td>P15.02</td><td>Received PZD2</td><td>0: Invalid<br>1: Set frequency (0–Fmax, unit: 0.01 Hz)</td><td>0</td></tr>
<tr><td>P15.03</td><td>Received PZD3</td><td rowspan="9">2: PID reference (0–1000, in which 1000 corresponds to 100.0%)<br>3: PID feedback (0–1000, in which 1000 corresponds to 100.0%)<br>4: Torque setting (-3000–+3000, in which 1000 corresponds to 100.0% of the rated current of the motor)<br>5: Setting of the upper limit of forward running frequency (0–Fmax, unit: 0.01 Hz)<br>6: Setting of the upper limit of reverse running frequency (0–Fmax, unit: 0.01 Hz)<br>7: Upper limit of the electromotive torque (0–3000, in which 1000 corresponds to 100.0% of the rated current of the motor)<br>8: Upper limit of the brake torque (0–3000, in which 1000 corresponds to 100.0% of the rated current of the motor)<br>9: Virtual input terminal command, 0x000–0x3FF (corresponding to S8, S7, S6, S5, HDIB, HDIA, S4, S3, S2, and S1 in sequence)<br>10: Virtual output terminal command, 0x00–0x0F (corresponding to RO2, RO1, HDO, and Y1 in sequence)<br>11: Voltage setting (for V/F separation)<br>(0–1000, in which 1000 corresponds to 100.0% of the rated voltage of the motor)<br>12: AO output setting 1 (-1000–+1000, in which 1000 corresponds to 100.0%)<br>13: AO output setting 2 (-1000–+1000, in which 1000 corresponds to 100.0%)</td><td>0</td></tr>
<tr><td>P15.04</td><td>Received PZD4</td><td>0</td></tr>
<tr><td>P15.05</td><td>Received PZD5</td><td>0</td></tr>
<tr><td>P15.06</td><td>Received PZD6</td><td>0</td></tr>
<tr><td>P15.07</td><td>Received PZD7</td><td>0</td></tr>
<tr><td>P15.08</td><td>Received PZD8</td><td>0</td></tr>
<tr><td>P15.09</td><td>Received PZD9</td><td>0</td></tr>
<tr><td>P15.10</td><td>Received PZD10</td><td>0</td></tr>
<tr><td>P15.11</td><td>Received PZD11</td><td>0</td></tr>
</table>

| | | | |
|---|---|---|---|
| P15.12 | Received PZD12 | 14: MSB of position reference (signed number) 15: LSB of position reference (unsigned number) 16: MSB of position feedback (signed number) 17: LSB of position feedback (unsigned number)<br>18: Position feedback setting flag (position feedback can be set only after this flag is set to 1 and then to 0) | 0 |

Response packet (inverter -> master station)

SW: The first word in a PZD response packet is an inverter SW. Table 2-7 describes the definitions of the inverter SWs.

Table 2-7 HD2 series SWs

| **Bit** | **Name** | **Value** | **State to be entered/description** |
|---|---|---|---|
| 0–7 | Running state | 1 | In forward running |
| | | 2 | In reverse running |
| | | 3 | Stopped |
| | | 4 | Faulty |
| | | 5 | POFF |
| | | 6 | In pre-excitation |
| 8 | Bus voltage established | 1 | Ready to run |
| | | 0 | Not ready to run |
| 9–10 | Motor group feedback | 0 | Motor 1 |
| | | 1 | Motor 2 |
| 11 | Motor type feedback | 1 | Synchronous motor |
| | | 0 | Asynchronous motor |
| 12 | Overload pre-alarm feedback | 1 | Overload pre-alarm generated |
| | | 0 | No overload pre-alarm generated |
| 13 | | 0 | Keypad-based control |

| | | | |
|---|---|---|---|
| 14 | Run/Stop mode | 1 | Terminal-based control |
| | | 2 | Communication-based control |
| | | 3 | Reserved |
| 15 | Heartbeat feedback | 1 | Heartbeat feedback |
| | | 0 | No heartbeat feedback |

Actual value (ACT): The second to twelfth words in a PZD task packet are the main actual values. The main actual frequency values are provided by the main actual value signal source.

Table 2-8 Actual state values of the HD2 series

| Function code | Word | Value range | Default value |
|---|---|---|---|
| P15.13 | Transmitted PZD2 | 0: Invalid<br>1: Running frequency (×100, Hz)<br>2: Set frequency (×100, Hz)<br>3: Bus voltage (×10, V)<br>4: Output voltage (×1, V)<br>5: Output current (×10, A)<br>6: Actual output torque (×10, %)<br>7: Actual output power (×10, %)<br>8: Rotating speed of the running (×1, RPM)<br>9: Linear speed of the running (×1, m/s)<br>10: Ramp frequency reference<br>11: Fault code<br>12: AI1 value (×100, V)<br>13: AI2 value (×100, V)<br>14: AI3 value (×100, V)<br>15: HDIA frequency (×100, kHz)<br>16: Terminal input state<br>17: Terminal output state<br>18: PID reference (×100, %)<br>19: PID feedback (×100, %)<br>20: Rated torque of the motor<br>21: MSB of position reference (signed number) | 0 |
| P15.14 | Transmitted PZD3 | | 0 |
| P15.15 | Transmitted PZD4 | | 0 |
| P15.16 | Transmitted PZD5 | | 0 |
| P15.17 | Transmitted PZD6 | | 0 |
| P15.18 | Transmitted PZD7 | | 0 |
| P15.19 | Transmitted PZD8 | | 0 |
| P15.20 | Transmitted PZD9 | | 0 |
| P15.21 | Transmitted PZD10 | | 0 |
| P15.23 | Transmitted PZD12 | | 0 |

| | | | |
|---|---|---|---|
| | | 22: LSB of position reference (unsigned number)<br>23: MSB of position feedback (signed number)<br>24: LSB of position feedback (unsigned number)<br>25: State word<br>26: HDIB frequency value (×100, kHz) | |

PKW zone (parameter identification flag PKW1—numerical zone): The PKW zone describes the processing mode of the parameter identification interface. A PKW interface is not a physical interface but a mechanism that defines the transmission mode (such reading and writing a parameter value) of a parameter between two communication ends.

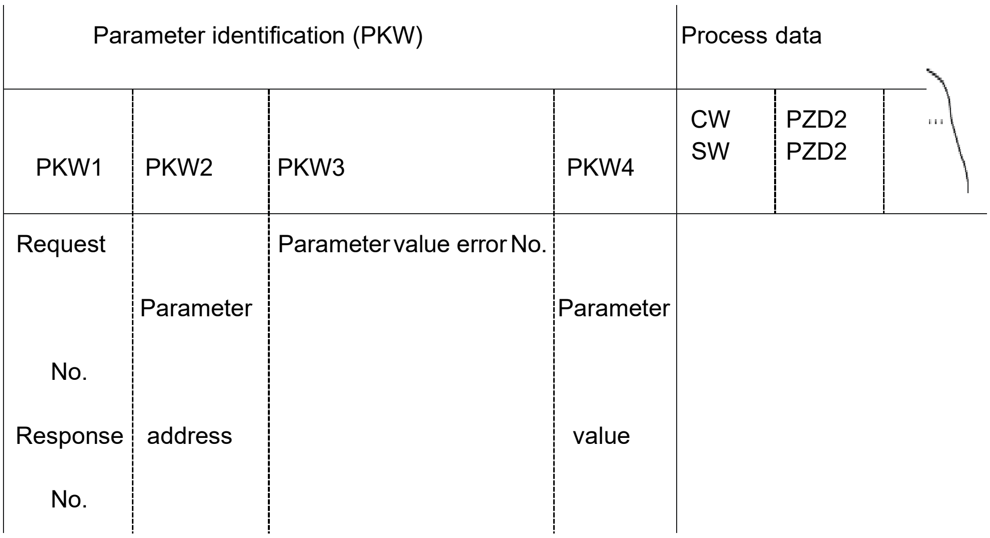



Figure 2-5 Parameter identification zone

In the periodic PROFIBUS-DP communication, the PKW zone consists of four 16-bit words. Table 2-9 describes the definition of each word.

Table 2-9 Definition of each word in the PKW zone

| First word PKW 1 (16 bits) | | |
|---|---|---|
| Bits 15–00 | Task or response identification flag | 0–7 |
| Second word PKW2 (16 bits) | | |
| Bits 15–00 | Basic parameter address | 0–247 |
| Third word PKW3 (16 bits) | | |

| | | |
|---|---|---|
| Bits 15–00 | Value (most significant word) of a parameter or error code of the returned value | 00 |
| Fourth word PKW4 (16 bits) | | |
| Bits 15–00 | Value (least significant word) of a parameter | 0–65535 |

Note: If the master station requests the value of a parameter, the values in PKW3 and PKW4 of the packet that the master station transmits to the inverter are no longer valid.

Task request and response: When transmitting data to a slave, the master uses a request number, and the slave uses a response number to accept or reject the request. Table 2-10 describes the request and response functions.

Table 2-10 Definition of the task identification flag PKW1

| **Request No. (from the master to a slave)** | | **Response signal** | |
|---|---|---|---|
| **Request No.** | **Function** | **Acceptance** | **Rejection** |
| 0 | No task | 0 | — |
| 1 | Requesting the value of a parameter | 1, 2 | 3 |
| 2 | Modifying a parameter value (one word) [modifying the value only on RAM] | 1 | 3 or 4 |
| 3 | Modifying a parameter value (two words) [modifying the value only on RAM] | 2 | 3 or 4 |
| 4 | Modifying a parameter value (one word) [modifying the value on both RAM and EEPROM] | 1 | 3 or 4 |
| 5 | Modifying a parameter value (two words) [modifying the value only on both RAM and EEPROM] | 2 | 3 or 4 |

The requests #2, #3, and #5 are not supported currently.

Table 2-11 Definition of the response identification flag PKW1

| Response No. (from a slave to the master) | |
|---|---|
| **Response No.** | **Function** |
| 0 | No response |
| 1 | Transmitting the value of a parameter (one word) |
| 2 | Transmitting the value of a parameter (two words) |
| 3 | The task cannot be executed and one of the following error numbers is returned:<br>1: Invalid command<br>2: Invalid data address 3: Invalid data value<br>4: Operation failure<br>5: Password error 6: Data frame error<br>7: Parameter read only<br>8: Parameter cannot be modified during inverter running 9: Password protection |

PKW examples

Example 1: Reading the value of a parameter

You can set PKW1 to 1 and PKW2 to 10 to read a frequency set through keypad (the address of the frequency set through keypad is 10), and the value is returned in PKW4.

Request (master station -> inverter)

| | PKW1 | | PKW2 | | PKW3 | | PKW4 | | CW | | PZD2 | | PZD3 | | ... | PZD12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Request | 00 | 01 | 00 | 10 | 00 | 00 | 00 | 00 | xx | xx | xx | xx | xx | xx | ... | xx | xx |

0001: Requesting to read a parameter values

0010: Parameter address

Response (inverter -> master station)

| | PKW1 | | PKW2 | | PKW3 | | PKW4 | | CW | | PZD2 | | PZD3 | | . . . | PZD12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Response | 00 | 01 | 00 | 10 | 00 | 00 | 50 | 00 | xx | xx | xx | xx | xx | xx | . . . | xx | xx |

0001: Response (parameter value updated)

5000: value in address 10

Response (inverter-> master station)

| | PKW1 | | PKW2 | | PKW3 | | PKW4 | | CW | | PZD2 | | PZD3 | | . . . | PZD12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Response | 00 | 01 | 00 | 10 | 00 | 00 | 50 | 00 | xx | xx | xx | xx | xx | xx | . . . | xx | xx |

0001: Response (parameter value updated)

PZD examples: The transmission of the PZD zone is implemented through inverter function code settings. For the function codes, see the related IMO inverter operation manual.

Example 1: Reading the process data of an inverter

In this example, PZD3 is set to "8: Rotating speed of the running" through the inverter parameter P15.14. This operation sets the parameter forcibly. The setting remains until the parameter is set to another option.

Response (inverter -> master station)

| | PKW1 | | PKW2 | | PKW3 | | PKW4 | | CW | | PZD2 | | PZD3 | | . . . | PZD12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Response | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | 00 | 0A | . . . | xx | xx |

Example 2: Writing process data to an inverter device

In this example, PZD3 is set to "2: PID reference" through the inverter parameter P15.03. The parameter specified in each request frame is updated with the information contained in PZD3 until another parameter is specified.

Request (master station -> inverter)

| | PKW1 | | PKW2 | | PKW3 | | PKW4 | | CW | | PZD2 | | PZD3 | | . . . | | PZD12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Response | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | xx | 00 | 00 | . . . | | xx | xx |

Subsequently, the information contained in PZD3 is used as tractive force reference in each request frame until another parameter is specified.

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